3.1 cont. More Quadratic Functions

Objective: To continue our study of quadratic functions

Warm-Up (IN)

Describe the graph (include vertex, axis of symmetry, direction of opening, max or min, increasing and decreasing intervals, domain and range, and intercepts)

SADMEP

$$y = -(x-3)^2 - 4$$

V(3,-4) inc $X<3$ y-int $y=-(0-3)^2-4$ $=-13$
$X=3$ dec $X>3$ x-int $0=-(x-3)^2-4$
opens ↓ D: R $4=-(x-3)^2$
max -4 R: $y\le -4$ $\sqrt{-4}=\sqrt{(x-3)^2}$ no x-int's

Feb 22-6:54 AM

Remember... $f(x) = a(x-h)^2 + k$

Ex 1:

a. Write an equation in vertex form for a parabola with the given info.

$y=(x-3)^2+5$

vertex: (3, 5)
axis of symmetry: x = 3
graph opens upward

b. What is the domain and range for this parabola? What values of x is it increasing? What values of x is it decreasing?

D: R incr $X>3$
R: $y\ge 5$ decr $X<3$

c. What are the x and y-intercepts for this parabolic function?

y-int $y=(0-3)^2+5$ $=14$

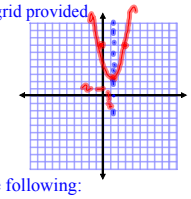
x-int $0=(x-3)^2+5$ $\sqrt{-5}=\sqrt{(x-3)^2}$ no x-int's

Jan 24-1:27 PM

How many y-intercepts can a quadratic function have? 1

How many x-intercepts can a quadratic function have? 0, 1, 2

Ex 2: Graph the equation from examples 1 and 2 on the grid provided.



Using a graphing calculator

Ex 3: Given the function: $f(x) = x^2 - 6x + 6$ Find the following:

1) Sketch the graph
2) vertex
3) max or min
4) range
5) exact intercepts

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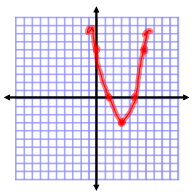
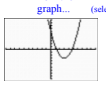
1) Sketch the graph... ← c'mon now, this should be cake!

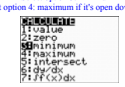


2) Vertex

From the graph...



Push 2nd, TRACE
Select option 3: minimum
(select option 4: maximum if it's open downward)

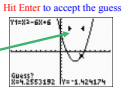


Move cursor left of vertex, Hit Enter

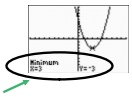
Move cursor right of vertex, Hit Enter

Make sure the vertex is in between the two arrows the program sets

Hit Enter to accept the guess



Smile, the calculator did your work!



Coordinates of the vertex!

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3) Max or min

Found by analyzing your vertex!

4) Range

Analyze both the graph and the vertex, use the info you've found already!

5) Exact intercepts

y-intercepts are found by setting x = 0 and solving

x-intercepts are found by using the quadratic formula OR the calculator

work:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

y-int $y=0^2-6(0)+6=6$

$0=x^2-6x+6$

$x=\frac{6\pm\sqrt{(-6)^2-4(1)(6)}}{2(1)}$

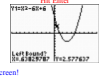
$=\frac{6\pm\sqrt{12}}{2}=\frac{6\pm 2\sqrt{3}}{2}=3\pm\sqrt{3}$

From graph you see two zeros

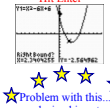
Hit 2nd, TRACE: Select option 2: zero Hit Enter

OR

Find one of the two zeros by moving cursor left of the intersection of graph and x-axis Hit Enter



Move cursor right of zero and Hit Enter



Accept the guess by hitting Enter

Zero is given at bottom of screen!

Do this again for the second zero

Problem with this... a decimal is not EXACT!

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Out: None

Summary: I can remember how to do all of this by...

HW: finish Quads wksht (yrs... all of it)

QUIZ TOMORROW

bring calc!

Feb 22-12:08 PM